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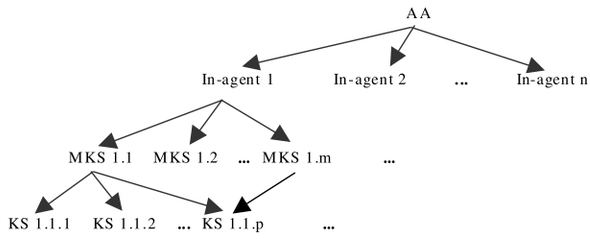

Figure 1. AA Hierarchy.

2.2.1 Knowledge Source (KS)

The **KS** is the minimum abstraction within the **ARTIS Agent** architecture with the knowledge (either procedural or rule-based) to solve some part of a problem. Therefore, the **MKS** will be formed by **KS**.

2.2.2 Multi-level Knowledge Source (MKS)

A **MKS** implements the concept of *anytime algorithm* and *multiple methods*, providing different solutions to the same problem with different computation times and different levels of quality [14]. Each one of these different solutions is a **level** of the **MKS**, and these levels are ordered so that the first one is the least time consuming and the worst quality solution. The last level is the best quality solution but it may be temporally unbounded. A level consists of a **KS**.

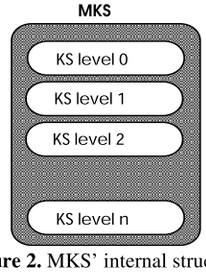

Figure 2. MKS' internal structure.

2.2.3 Internal Agent or In-Agent

An **in-agent** is an ARTIS internal entity that has the necessary knowledge to solve a particular problem (this knowledge can incorporate IA techniques that provide "intelligence" for solving the problem). This entity periodically performs a specific task (which may or may not be complex).

To provide its desired behaviour, each **in-agent** consists of:

- A Perception level: get the environment data that the **in-agent** is interested in.
- A Cognition level: it is formed by two layers:
  1. A Reflex layer: assures a minimum answer (low quality answer in a bounded time) to the particular problem it is applied to.
  2. A Real-Time Deliberative (RTD) layer: calculates a reasoned answer through a deliberative process.